REMARKS

The Office Action dated October 11, 2002 has been fully considered by the Applicant.

Substitute drawings are submitted herewith to address the Examiner's objections thereto. Likewise, amendments have been made to the specification in accordance with the Examiner's comments.

The rejection of the claims 35 U.S.C. §112 has been addressed by amendment of Claim 1 and rewriting of the remaining claims.

With regard to Claim 1, the present invention relates to an apparatus and a method for isolation of the structural elements which are electrically isolated in the micro-gyroscope, and the micro-gyroscope fabricated thereby.

Generally, a micro-gyroscope of decoupled type comprises a driving spring, a sensing spring, driving comb, and sensing comb, etc. The micro-gyroscope also includes electrodes(such as driving electrode or sensing electrode) to drive such elements or to receive the signal from such elements.

However, the present invention is not characterized by the particular elements which should be electrically isolated, but characterized by the method for isolating elements electrically. In addition, it is apparent to those skilled in the art which elements should be electrically isolated in the micro-gyroscope.

For example, those skilled in the art may know that the comb structures should be electrically isolated from each other, and that the driving electrode and the sensing electrode should be electrically isolated from each other, and that the driving comb and the driving comb electrode should be electrically connected.

That is, which specific elements should be electrically isolated is known to the skilled in the art and it is not a feature of the present invention. Therefore, we are of the opinion that it does not need to specify the elements which should be electrically isolated. The elements which should be electrically isolated may be electrically isolated according to the present invention.

Therefore, Claim 1 has been amended and Claims 13 and 14 added as dependent claims to specify the electrode and the elements which should be electrically isolated.

Further, Claim 22 has been added to specify where the polysilicon layer is partially etched, and Claim 23 added to specify the formation of metal layer. Method Claims 26-31 are also newly added.

Regarding the limitation of Claim 1 of a polysilicon layer that is "partially etched to accomplish the electrical isolation" and Fig. 6, the meaning that a polysilicon layer is partially etched to accomplish the electrical isolation is explained in reference to Figs. 6 and 9.

Fig. 6 illustrates the cross-sectional view of the trench in the comb structure of the micro-gyroscope depicted in Fig. 9. The plane view of comb structure and its cross-sectional view are illustrated in the new Figs. 20 and 21, respectively, submitted herewith. New Figures 20 and 21 are alternate views of the invention disclosed and do not present new matter.

According to the present invention, all of the exposed surface of the comb structure is oxidized(Fig. 6a), and deposited with polysilicon(Fig. 6b). Then, the metal is sputtered or evaporated, and thus, metal layer is formed at the top surface and the upper sidewall of the microstructure(Fig. 6c). Then, in order to electrically isolate the two structures (210, 220), which are forming the comb structure, some part of polysilicon is etched and removed.

That is, polysilicon is deposited on the whole, and then, the polysilicon layer is partially etched and removed on the boundary between the structural elements requiring electrical isolation. Thus, the electrical isolation between the elements requiring electrical isolation is accomplished.

To clarify that Fig. 6 relates to the electrical isolation of the comb structure, the specification on page 14, line 3 has been amended.

Regarding the electrical isolation of the driving spring and the sensing spring (specification page 13 lines 17-19).

The electrical isolation between the driving spring and the sensing spring is mentioned in the specification(lines 17-19 of page 13). However, such descriptions exemplify the elements which should be electrically isolated in the micro-gyroscope. It does not mean that only the driving spring and the sensing spring are required to be electrically isolated.

Those skilled in the art may isolate electrically not only between the driving spring and the sensing spring but also between any other elements requiring electrical isolation by applying the example of isolation of the comb structure depicted in Fig. 6.

The previous Claim 2 has been rewritten as new Claim 15 as a dependent claim to specify the structure.

The previous Claim 3 has been rewritten as new Claim 16 to specify that the partially etched polysilicon accomplishes the electrical isolation.

Whether the electrical isolation is between springs or between electrodes is unimportant. As mentioned above, although the electrical isolation between the driving spring and the sensing spring is mentioned in the specification (lines 17-19 of page 13), such descriptions just exemplify the elements which should be electrically isolated in the micro-gyroscope.

Claim 16 specifies that the micro-gyroscope is a decoupled type. The micro-gyroscope of decoupled type is one wherein the driving part (which comprising driving spring, driving electrode, driving mass, etc.) and the sensing part (which comprising sensing spring, sensing electrode, sensing mass, etc.) are separate as described in the specification (page 2 and page 16).

Therefore, in the micro-gyroscope of decoupled type, the driving electrode and the sensing electrode should be also separate. Of course, the driving spring and the sensing spring should be also separate.

As mentioned in the above, Fig. 6 illustrates an example for electrical isolation of comb structure.

As mentioned above, the micro-gyroscope of decoupled type is one wherein the driving part (which comprising driving spring, driving electrode, driving mass, etc.) and the sensing part (which comprising sensing spring, sensing electrode, sensing mass, etc.) are separate.

In the meantime, the driving spring and its electrode (driving electrode) should be electrically connected. Likewise, the sensing spring and its electrode should be electrically connected.

Therefore, the electrical isolation of the driving spring and the sensing spring is the same with that of the driving electrode and the sensing electrode.

As mentioned above, the polysilicon is deposited on the whole, and then, the polysilicon layer is partially etched and removed on the boundary between the structural elements requiring electrical isolation. Thus, the electrical isolation between the elements requiring electrical isolation is easily accomplished.

Previous Claim 4 has been rewritten as new Claim 17 as a dependent claim referring to Claim 14 so that it may refer to the driving spring and the sensing spring.

Previous Claim 5 has been rewritten as new Claim 18 as a dependent claim referring to Claim 17 so that it may refer to the driving springs and the sensing springs.

Previous Claim 6 has been rewritten as new Claim 19 as a dependent claim referring to Claim 18.

Previous Claim 7 has been rewritten as new Claim 32 as a dependent claim referring to Claim 16. The symbol after "10" is μm.

Claims 8-10 have been canceled.

Previous Claim 11 has been rewritten as new Claim 20 as a dependent claim referring to Claim 14 so that it may refer to the substrate. The phrase "sensing spring" is amended to "sensing electrode".

Previous Claim 12 has been rewritten as new Claim 21 as a dependent claim referring to Claim 20.

The Examiner initially rejected Claims 1 through 4 for lack of novelty in view of U.S. Patent No. 6,055,858 (Cited Reference). No art rejections were made on previous Claims 5 through 12.

In the Cited Reference, the third layers (conductive or semiconductive material) (3) which are deposited on the silicon substrate (1) are electrically isolated from each other since the trenches (10) are separate.

However, in the present invention, the polysilicon is deposited on the whole, for example, on the sidewall and the bottom of the trenches. The polysilicon layer is partially etched and removed on the boundary between the structural elements requiring electrical isolation. Further, in the Cited Reference, the three (3) layers are deposited by patterning. On the other hand, in the present invention, after metal layer is deposited, some part of polysilicon is etched away. During etching,

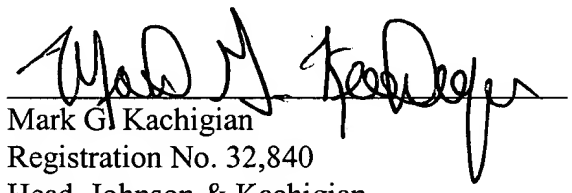
the metal layer serves as a mask. Thus, the electrical isolation between the elements requiring electrical isolation is easily accomplished.

The cited reference does not disclose such constitution and isolation method according to the present invention. Therefore, the present invention is different from the invention of the cited reference.

Also enclosed is a Request for 3-Month Extension of Time and a check in the amount of $465 to cover the extension fee.

It is believed that the application is now in condition for allowance and such action is earnestly solicited. If any issues remain, a telephone conference with the Examiner is requested.

Respectfully submitted,



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